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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :
HANS-DETLEF LUGINSLAND, ET AL. : EXAMINER: PARVINI, PEGAH
SERIAL NO: 10/542,850 :
FILED: JUNE 13, 2006 : GROUP ART UNIT: 1793
FOR: SPECIALLY PRECIPITATED :
SILICIC ACIDS FOR RUBBER
APPLICATIONS

REPLY BRIEF

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313-1450

SIR:

This is in reply to the Examiner's Answer dated July 24, 2009.

UPDATE ON RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative and the assignee are aware of no appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal, except for an appeal in co-pending application Serial No. 10/542,763 in which a Notice of Appeal has been filed in on March 16, 2009 and an Appeal Brief was filed on April 24, 2009. This case was mentioned in the Appeal Brief filed in the present case. Additional appeals have been filed in the following related cases:

Serial No. 10/516,308 in which a Notice of Appeal and Appeal Brief were filed on September 1, 2009;

Serial No. 10/523,029 in which a Notice of Appeal and Appeal Brief were filed on April 29, 2009; and

Serial No. 10/522,672 in which a Notice of Appeal and Appeal Brief were filed on June 22, 2009.

The examiner adheres to the rejections as follows:

(A) Claims 1-7, 18, 19 and 23-31 stand rejected as being obvious under 35 U.S.C. §103 (a) over Esch et al (US 5,846,506) in view of Boyer et al (US 5,935,543).

(B) Claim 8 stands rejected as being obvious under 35 U.S.C. §103 (a) over Esch et al (US 5,846,506) in view of Boyer et al (US 5,935,543) and further in view of Uhrlandt et al (US 6,180,076).

(C) Claims 1-7, 18, 19 and 23-29 stand rejected as being obvious under 35 U.S.C. §103 (a) over Esch et al (US 5,846,506) in view of Luginsland (US 2002/0022693).

(D) Claims 1-5, 7, 8, 18, 19 and 23-31 stand rejected as being obvious under 35 U.S.C. §103 (a) over Uhrlandt et al (US 6,180,076) in view of Boyer et al.

(E) Claims 1-8, 18, 19 and 21-23 stand provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-9, 16-17 and 19-21 of co-pending application Serial No. 10/542,763.

(F) Claim 24 stands objected to as being dependent on a withdrawn claim.

The above rejections and objections are again traversed.

The precipitated silica as claimed in **Claim 1** has the following physical and chemical properties:

| | |
|-------------------|----------------------------|
| CTAB surface area | 100-200 m ² /g, |
| BET/CTAB ratio | 0.8-1.05, |
| DBP value | 210-280 g/(100 g), |
| Sears value V2 | 10-30 ml/(5 g), |

| | |
|-------------------------------|---------------------------------------|
| Moisture level | 4-8% , and |
| Ratio of Sears value V_2 to | |
| BET surface area | 0.150 to 0.370 ml/(5m ²). |

Esch et al (US 5,846,506) in view of Boyer et al (US 5,935,543) do not disclose the **combination of the features** as claimed in Claim 1, in particular the high ratio of Sears value V_2 to BET, which gives the precipitated silicas of the invention excellent suitability as reinforcing fillers for elastomers. The combined references do not disclose that a high **ratio of the Sears value V_2 to the BET surface area** as claimed (0.150 to 0.370) would give the advantages shown in the specification of the present invention.

The Examiner has simply repeated the arguments made in the final Office Action and has not addressed the selection invention argument that applicants presented in the Appeal Brief. The Examiner is requested to specifically address the case law that Applicants have cited in support of their arguments.

Selection inventions, also referred to as "improvement patents," are a normal consequence of technological progress and are expressly provided for by statute. 35 U.S.C. § 101 ("Whoever invents . . . any new and useful . . . composition of matter, or any . . . *improvement thereof* . . . may obtain a patent therefor . . .") (emphasis added). *Eli Lilly & Co. v. Zenith Goldline Pharms., Inc.*, 364 F. Supp. 2d 820, 897 (S.D. Ind. 2005); Affirmed by: *Eli Lilly & Co. v. Zenith Goldline Pharms., Inc.*, 471 F.3d 1369, 2006 U.S. App. LEXIS 31748, 81 U.S.P.Q.2d (BNA) 1324 (Fed. Cir. 2006).

Inventions based on the identification or selection of a specific material or compound with particularly desirable properties within a previously disclosed genus of such materials or compounds do not violate any of the substantive requirements for patentability. *See e.g., In re*

Ruschig, 343 F.2d 965, 974-75, 52 C.C.P.A. 1238, 1965 Dec. Comm'r Pat. 482 (C.C.P.A. 1965) (prior generic disclosure did not anticipate later selected species under 35 U.S.C. § 102); *CFMT, Inc. v. Yieldup Int'l Corp.*, 349 F.3d 1333, 1340 (Fed. Cir. 2003) ("Improvement and selection inventions are ubiquitous in patent law . . ."); *In re Kaplan*, 789 F.2d 1574, 1578, 1580 (Fed. Cir. 1986) (prior generic patent claim did not invalidate claim to later selected species for double patenting); *In re Baird*, 16 F.3d 380, 382 (Fed. Cir. 1994) (prior generic disclosure did not render later selected species obvious under 35 U.S.C. § 103).

The claimed precipitated silicas have a ratio of Sears value V_2 to BET surface area is 0.150 to 0.370 ml/(5m²). This correlates to a very high number of silanol groups based on the total surface area. (See the specification at page 5, line 27 to page 6, line 7).

Esch disclose an absolute range for the BET surface of 35 to 350 m²/g and an absolute number of silanol groups, i.e. silanol group range of 6 to 20. See col. 1, table.

As can be calculated from the examples of Esch, the ratio of Sears number / BET, i.e. the relative silanol group density, is in a range between **0.076 and 0.1125** and thus lower than the claimed **0.150 to 0.370**. The highest relative silanol group density disclosed in Esch is 0.1125 which is **about 25% lower than the lowest limit in the present claims**.

The Examiner argues that by dividing the broad silanol group number and the broad BET number disclosed at col. 1, one would arrive at the claimed ratio. Each of the examples 1, 2 and 3 of Esch (US 5,846,506) discloses the BET and Sears value. The N₂ surface area is the BET. The Examples 4-12 use the silicas of Examples 2 or 3. Example 5 of Esch shows a comparison of BET to Sears number of the Examples of Esch and all state of the art silica, accordingly the state of the art silica have a Sears/BET ratio far below 0.170, too.

Even if the broad ranges of col. 1 of Esch are used to calculate the Sears/BET ratio, if the reference's disclosed range is so broad as to encompass a very large number of possible distinct compositions, this might present a situation analogous to the obviousness of a species when the prior art broadly discloses a genus. *Id.* See also *In re Baird*, 16 F.3d 380, 29 USPQ2d 1550 (Fed. Cir. 1994); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); MPEP § 2144.08.

Moreover, Applicants can rebut a *prima facie* case of obviousness based on overlapping ranges by showing the criticality of the claimed range. "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). see also *Iron Grip Barbell Co., Inc. v. USA Sports, Inc.*, 392 F.3d 1317, 1322, 73 USPQ2d 1225, 1228 (Fed. Cir. 2004). See MPEP 2144.05 III.

Applicants have prepared a comparative Example comparing the silicas of the present invention with those of Example 3 of Esch (Example 3 of Esch is a commercial product "Ultrasil 3370", i. e. **the most important Example of Esch and the closest prior art**). A comparison to the closest prior art is the appropriate comparison. Example 3 of Esch was the only product from the Esch patent which became a commercial product "Ultrasil 3370" (see Uhrlandt, US 6,180,076, col. 9, line 53 to 55).

A **Rule 132 Declaration** was filed June 9, 2008, entered by the Examiner as stated at page 2, first paragraph of the Office Action of July 16, 2008 (Exhibit A).

The Declaration states the following at page 1, last two paragraph to page 2, 1st and second paragraphs:

“Enclosed is a comparison experiment in which the properties of the silica according to Example 3 of US 5,846,506 are compared with those of the silica III of the Examples of the present invention (see page 35, starting at line 30 of the specification).

The precipitated silicas of the present invention have clearly improved processing properties because of the higher ratio of Sears number to BET. In other words, using the silicas of the present invention leads to drastically shorter vulcanization times, greater vulcanization rates and lower Mooney viscosities.

The enclosed comparison example therefore confirms the statements starting at page 16, line 28 of the specification, according to which the increased number of silanol groups per m² of surface area leads to improved and better binding of the coupling agent (silane).

The comparison example clearly demonstrates the relevance of the ratio of Sears number to BET and also shows that this parameter leads to a considerable improvement in performance of the silica of the present invention compared with the silica of US 5,846,506.”

The comparison example therefore confirms the statements starting at page 16, line 28 of the specification, according to which the increased number of silanol groups per m² of surface area leads to improved and better binding of the coupling agent (silane). The comparison example clearly demonstrates the relevance of the ratio of Sears number to BET of 0.150 to 0.370 ml/(5m²) and also shows that this parameter leads to a considerable improvement in performance of the silica of the present invention compared with the silica of US 5,846,506.

The Rule 132 Declaration further states at page 6, below the table to page 7, 3rd paragraph:

The compounds containing the silicas according to the present invention have a profile of rubber values superior to that of the US 5,846,506. For example, the properties of the raw mixture include a lower Mooney viscosity, as confirmed by the M_L value in the MDR test. Thus, improved processing behavior is demonstrated. In

addition, the vulcanization time t 90% and the vulcanization rate t 80% - t 20% are drastically reduced.

These greatly improved raw-mixture properties can be attributed in particular to the higher and therefore better ratio of Sears number to BET surface area, since hereby faster and more effective hydrophobing and thus greater binding capacity of the silane to the silica are possible.

The greatly improved properties of the vulcanized derivative can also be attributed for the most part to this analytical characteristic. For example, the improved binding of the silicas leads to better reinforcement of the vulcanized derivative in the tension test, as seen in the higher value of modulus 200% and the higher modulus 200% / 50% reinforcement factor. As a consequence, the DIN abrasion is improved by more than 18%. Surprisingly, the hysteresis behavior, which correlates directly with the rolling resistance of a tire finished with this running-surface compound, can also be improved simultaneously by more than 18% with the inventive silicas (see $\tan \delta$, 60 °C). This improvement is also confirmed by the ball rebound value, 70 °C.

The precipitated silicas of the present invention have clearly improved processing properties because of the higher ratio of Sears number to BET. In other words, using the silicas of the present invention leads to drastically shorter vulcanization times, greater vulcanization rates and lower Mooney viscosities.

The enclosed comparison example therefore confirms the statements starting at page 16, line 28 of the specification, according to which the increased number of silanol groups per m² of surface area leads to improved and better binding of the coupling agent (silane).

The comparison example clearly demonstrates the relevance of the ratio of Sears number to BET and also shows that this parameter leads to a considerable improvement in performance of the silica of the present invention compared with the silica of US 5,846,506.

Boyer et al do not cure the defects of Esch et al as they do not disclose the combination of the claimed properties, in particular the high ratio of Sears value V_2 to BET, which gives the precipitated silicas of the invention excellent suitability as reinforcing fillers for elastomers.

The data presented in the Rule 132 Declaration rebut any prima facie case of obviousness. Applicants disagree with the Examiner's statement at page 17, last paragraph of the Office Action of July 16, 2008, that the data are not commensurate with scope of the claims. Moreover, the specification contains additional data for the claimed invention. See

the table at page 36 of the specification. Further, regarding the test data shown in Table 4 at page 41 of the specification, it is disclosed at page 41, starting at line 4:

As can be seen from the data in Table 4, the Silica Ib and Silica II mixtures with the silicas of the invention have a lower vulcanization time $t_{90\%}$ than the reference mixture REF, due to lower microporosity and therefore less surface-adsorption of accelerator. The advantageous higher activity of these silicas is reflected in the higher 100% and 300% stress values and the increased reinforcement factor. The dynamic properties of the mixtures with the silicas of the invention have likewise been improved. Ball rebound 0°C. is found to be lower, implying improved wet skid resistance, and ball rebound 60°C. is found to be higher, indicating better rolling resistance of a tire tread. The dynamic stiffnesses at 0 and 60°C. are at the same level as those of the reference mixture, while the hysteresis loss $\tan\delta$ (60°C.) has an advantageously been lowered, indicating lower rolling resistance. In addition, the quality of dispersion of the silicas of the invention is extraordinarily high and, *inter alia*, better than that of the silica Ultrasil 7000 GR of the prior art, which itself has good dispersibility, thus achieving advantages in road abrasion.

Moreover, the Rule 132 Declaration clearly states that the precipitated silicas of the present invention have clearly improved processing properties because of the higher ratio of Sears number to BET. In other words, using the silicas of the present invention leads to drastically shorter vulcanization times, greater vulcanization rates and lower Mooney viscosities. The Declaration further states that the enclosed comparison example therefore confirms the statements starting at page 16, line 28 of the specification, according to which the increased number of silanol groups per m^2 of surface area leads to improved and better binding of the coupling agent (silane). In addition, the Declaration also states that the comparison example clearly demonstrates the relevance of the ratio of Sears number to BET and also shows that this parameter leads to a considerable improvement in performance of the silica of the present invention compared with the silica of US 5,846,506.

Thus, the data presented are commensurate in scope with the claims.

The combined references do not disclose that a high **ratio of the Sears value V_2 to the BET surface area** as claimed (0.150 to 0.370) would give the advantages shown in the

specification of the present invention. The parameter ratio of Sears value V₂ to BET surface area is not mentioned by even one word in Esch et al. Therefore, Esch did not know about the importance of said parameter. Instead Esch teaches other parameters as important.

Esch et al (US 5,846,506) in view of Luginsland (US 2002/0022693) do not disclose the **combination of the features** mentioned, in particular the high ratio of Sears value V₂ to BET, which gives the precipitated silicas of the invention excellent suitability as reinforcing fillers for elastomers.

Esch was discussed in detail above.

Luginsland does not cure the defects of Esch et al as there is no disclosure of the combination of the features mentioned, in particular the high ratio of Sears value V₂ to BET, which gives the precipitated silicas of the invention excellent suitability as reinforcing fillers for elastomers. The combined references do not disclose that a high **ratio of the Sears value V₂ to the BET surface area** as claimed (0.150 to 0.370) would give the advantages shown in the specification of the present invention.

Uhrlandt et al (U.S. 6,180,076) in view of Boyer et al (US 5,935,543) do not disclose the **combination of the features** mentioned, in particular the high ratio of Sears value V₂ to BET, which gives the precipitated silicas of the invention excellent suitability as reinforcing fillers for elastomers. The parameter ratio of Sears value V₂ to BET surface area is not mentioned in Uhrlandt. Therefore, Uhrlandt did not know about the importance of said parameter. Instead Uhrlandt teaches other parameters as important.

Most notably, the Examples 1-5 of Uhrlandt et al disclose low ratios of Sears index to N_s surface area of 0.083; 0.053; 0.103; 0.092; and 0.099, respectively. So, even the highest

ratio of Uhrlandt et al (0.103) is about 32 % lower than the lower limit of the ratio of the Sears value V_2 to the BET surface area claimed (0.150).

Uhrlandt also uses Example 3 of Esch (discussed above) as representative comparison Example for the teaching of Esch and the Uhrlandt patent was granted even though the ranges of Uhrlandt overlap the ranges of Esch in a similar manner as in the present case.

The specification contains data for the claimed invention and showing the criticality of the claimed **high ratio of the Sears value V_2 to the BET surface area compared to a silica having a low ratio of the Sears value V_2 to the BET of 0.092 (Ultrasil 7000GR, which is in the order of the silicas exemplified for Uhrlandt et al)**. See the table at page 36 of the specification. Silica Ib (present invention) has a ratio of 0.167 and Silica II (present invention) has ratio of 0.190.

Further regarding the test data shown in Table 4 at page 41 of the specification, it is disclosed at page 41, starting at line 4:

As can be seen from the data in Table 4, the Silica Ib and Silica II mixtures with the silicas of the invention have a lower vulcanization time $t_{90\%}$ than the reference mixture REF, due to lower microporosity and therefore less surface-adsorption of accelerator. The advantageous higher activity of these silicas is reflected in the higher 100% and 300% stress values and the increased reinforcement factor. The dynamic properties of the mixtures with the silicas of the invention have likewise been improved. Ball rebound 0°C. is found to be lower, implying improved wet skid resistance, and ball rebound 60°C. is found to be higher, indicating better rolling resistance of a tire tread. The dynamic stiffnesses at 0 and 60°C. are at the same level as those of the reference mixture, while the hysteresis loss $\tan\delta(60^\circ\text{C.})$ has an advantageously been lowered, indicating lower rolling resistance. In addition, the quality of dispersion of the silicas of the invention is extraordinarily high and, inter alia, better than that of the silica Ultrasil 7000 GR of the prior art, which itself has good dispersibility, thus achieving advantages in road abrasion.

Thus, the data are commensurate in scope with the claims.

Boyer et al do not cure the defects of Uhrlandt et al as they do not disclose the combination of the claimed properties, in particular the high ratio of Sears value V_2 to BET,

which gives the precipitated silicas of the invention excellent suitability as reinforcing fillers for elastomers. The combined references do not disclose or suggest that a high **ratio of the Sears value V_2 to the BET surface area** as claimed (0.150 to 0.370) would give the advantages shown in the specification of the present invention.

The claims of Serial No. 10/542,763 do not disclose the **combination of the features** claimed, which gives the precipitated silicas of the invention excellent suitability as reinforcing fillers for elastomers. Thus, this rejection should be withdrawn.

In addition, regarding the provisional double patenting rejection, the MPEP instructs the Examiner to withdraw the provisional rejection if it is the only issue remaining in one case and convert the provisional rejection in the other application to a double patenting rejection. MPEP 822.01.

Claim 24 stands objected to as being dependent on a withdrawn claim. That objection is untenable and should not be sustained. Claim 9 was erroneously withdrawn from consideration as clearly unity of invention exists in this application. See also the International Search Report dated July 21, 2005, receipt of which was acknowledged by the Office on Form PCT/DO/EO/903 (371 Acceptance Notice mailed August 8, 2006). Lack of unity of invention was not found by the International Authority. Applicants note that PCT Article 27(1) states that no national law shall require compliance with requirements relating to the form and contents of the International application different from or additional to those which are provided for in the Patent Cooperation Treaty and the Regulations. Claim 9 should not have been withdrawn from consideration. An appropriate and timely traversal was made in the Response filed June 22, 2007. As a result the objection to Claim 24 should be withdrawn as well.

Moreover, once the product claims are found allowable, withdrawn process claims which depend from or otherwise include all the limitations of the allowable product claim should be rejoined. MPEP §821.04. Applicants respectfully submit that should the elected group be found allowable, the non-elected claims should be rejoined.

CONCLUSION

For the above reasons, it is respectfully requested that all the rejections and objections of record, be REVERSED.

Respectfully submitted,

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A handwritten signature in cursive script, reading "Kirsten Gruenberg".

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